

An Internet of Custom-Made Things: From 3D Printing and Personal Fabrication to Personal Design of Interactive Devices

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In the homes of bleeding-edge tinkerers around the world, a revolution is happening that, as many predict, will overshadow the PC and internet revolutions that began with home computers in the 70's: Personal Fabrication. Sub-\$1000 3D printers are a reality, and other computer-controlled digital fabrication tools such as lasercutters are close behind. Research labs are printing anything from molecules to entire houses, and Fab Labs around the world are introducing the public to the possibilities and dangers of this new era in production.

On the one hand, these tools are bringing exciting changes to the way we teach and do ubicomp and HCI research: Instead of merely creating on-screen prototypes, students are now able to rapidly create actual working, networked hardware prototypes with little effort, driving home the message that successful interactive products today require software and hardware design to go hand in hand. As personal fabrication technologies evolve to include multiple materials and even electronics in custom-made objects, their interface will likely be mediated via online services, leading to new challenges for how to create the appropriate web-based architectures for an Internet of Custom-Made Things. On the other hand, it is still largely unclear how users at home should create those 3D models to print or otherwise fabricate on their desktop factory of the near future: For example, will they download and customize online designs, specifying their search queries for object models via hand shape gestures in mid-air? This is a major challenge for HCI that calls for radically new user interface approaches, paradigms and interaction techniques for what I call "Personal Design", before we'll arrive at something like the MacPaint of Digital Fabrication.